



**STD 10– FIRST BELL 2.0– CHEMISTRY – CLASS-17**

Chapter 2

**GAS LAW AND MOLE CONCEPT**

**Important Equations**

- Number of GAM =  $\frac{\text{Given Mass in grams}}{\text{GAM of the element.}}$
- Number of atoms = Number of GAM  $\times$  NA.
- Number of Mole atoms = Number of GAM.
- Mass = Number of mole  $\times$  GAM
- Number of atoms = Number of Mole atoms  $\times$  NA.
- Number of atoms = Number of molecules  $\times$  Atomicity.
- Number of GMM =  $\frac{\text{Given Mass in gram}}{\text{GMM}}$
- Number of Molecules = Number of GMM  $\times$  NA.
- Number of Mole molecules = Number of GMM.
- Number of Molecules = Number of mole molecules  $\times$  NA.
- Mass = No of Mole  $\times$  GMM
- Number of Moles =  $\frac{\text{Volume in Litre at STP}}{22.4 \text{ L}}$
- Volume = No of moles  $\times$  22.4

**PROBLEMS**

1. Atomic mass of Nitrogen is 14 which of these samples contains  $6.022 \times 10^{23}$  Nitrogen atoms?  
(7g Nitrogen, 14 g Nitrogen, 28g Nitrogen, 1g Nitrogen).

Ans:

Number of atoms = No of GAM  $\times$  NA

Number of GAM =  $\frac{\text{Given gram}}{\text{GAM}}$

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$$= \frac{14}{14} = 1$$

$$\text{Number of atoms} = 1 \times 6.022 \times 10^{23}$$

$$14\text{g Nitrogen} = 6.022 \times 10^{23}$$

2. How many GAM & GMM present in 64 g oxygen? (Atomic mass O=16)

Ans:

$$\text{No of GAM} = \frac{\text{Given Mass in grams}}{\text{GAM of the element}}$$

$$= \frac{64}{16} = 4\text{GAM.}$$

$$\text{Number of GMM} = \frac{\text{Given Mass in gram}}{\text{GMM}}$$

$$= \frac{64}{32} = 2\text{GMM}$$

3. Calculate the following.

a) How many GAM is present in 115g sodium?

b) Mass of 5 mole of calcium atom

(Atomic mass Na=23, Ca=40)

Ans:

a. No of GAM =  $\frac{\text{Given Mass in grams}}{\text{GAM of the element}}$

$$= \frac{115}{23} = 5\text{GAM}$$

b. Mass = No of Mole  $\times$  GAM

$$= 5 \times 40 = 200\text{g.}$$

4. Molecular mass of CH<sub>4</sub> is 16.

a) Find the mass of 1GMM CH<sub>4</sub>

b) How many moles of molecules are present in 160g CH<sub>4</sub>.

c) Find the mass of  $5 \times 6.022 \times 10^{23}$  in CH<sub>4</sub>.

Ans:

a. 16g

b. Number of Mole molecules = Number of GMM.

$$= \frac{160}{16} = 10\text{mole}$$

c. Mass = No of Mole  $\times$  GMM

$$= 5 \times 16 = 80\text{g.}$$

5. Arrange the following sample in the increasing order of the number of molecules in each.

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- a) 180 g H<sub>2</sub>O  
b) 44.8L NH<sub>3</sub>  
c) 20g He  
d) 1 mol H<sub>2</sub>SO<sub>4</sub>. (Atomic mass H=1, I=16 He=4)

Ans:

Number of Molecules = Number of mole  $\times$  NA.

$$\text{Number of Mole} = \frac{\text{Given Mass in gram}}{\text{GMM}}$$

a.  $\frac{180}{18} = 10 \text{ mole}$

No of molecules =  $10 \times \text{NA}$

b.  $\frac{44.8}{22.4} = 2 \text{ mole}$

=  $2 \times \text{NA}$

c.  $\frac{20}{4} = 5 \text{ mole}$

$5 \times \text{NA}$

d. No of molecule =  $1 \times \text{NA}$

$d < b < c < a$

## HOME WORK

- The molecular mass of Ammonia is 17.
- a) How much is the GMM of Ammonia?
- b) Find out the number of moles of molecules present in 170g of Ammonia.
- c) Calculate the number of ammonia molecules present in the above sample of ammonia?
- d) What will be the total number of atoms?
- e) What is the volume of 10 mole Ammonia at STP?
- f) Calculate the mass of 112L Ammonia at STP?

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